Cheri Sawyer

From: Shyam Sunder [sunder@nist.gov]
Sent: Thursday, September 25, 2003 9:58 AM
To: ddevans@nist.gov
Cc: james.lawson@nist.gov; jason.averill@nist.gov; wgrosshandler@nist.gov; cheri.sawyer@nist.gov
Subject: Fwd: FW: WTC - Fire Alarm System

Design
s of WTC f

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>X-Sieve: CMU Sieve 2.2
>From: "Bhol, Saroj" <sbhol@panynj.gov>
>To: "Shyam Sunder (E-mail)" <sunder@nist.gov>
>Cc: "Buchsbaum, Jack" <jbuchsba@panynj.gov>,
>     "Begley, James"
>          <jbegley@panynj.gov>, "Fadavi, Ali" <afadavi@panynj.gov>,
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>     "'jlawson@nist.gov'"
>          <jlawson@nist.gov>
>Subject: FW: WTC - Fire Alarm System
>Date: Thu, 25 Sep 2003 09:33:44 -0400
>X-Mailer: Internet Mail Service (5.5.2653.19)
>X-MailScanner:
>
>Shyam,
>
>A former WTD employee, who declined to disclose his name, provided some
>information on WTC fire alarm system, which may be useful to NIST.
>Please see the attachment for the information provided by him.
>
>Thanks
>
>Saroj
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The following represents a brief overview and is my best recollection of some of the objectives and design features of the WTC fire alarm system:

The WTC was in the final stages of a $100M program to replace the fire alarm system for the entire 15 million SF complex. Approximately $80M had been invested when the WTC was destroyed.

At the time of the 1993 terrorist attack on the WTC, the existing fire alarm system was under study to determine what needed to be done to bring the complex up to current codes and ADA Standards. The first week following the February 26, 1993 attack, the decision was made to replace the entire fire alarm system with a modern, state-of-the-art, centralized, fully addressable fire alarm system.

Design started immediately and construction followed shortly on a T & M basis as there was concern that existing fire alarm system, which had been repaired after being badly damaged, would not hold.

The complex was divided into six areas each to have its own fire command center (FCC) located near the lobby entrance as required by code. The systems were 1 WTC, 2 WTC, 4 WTC, 5 WTC, the Mall and the 6 level Subgrade under the towers. The divisions were somewhat arbitrary, as no fire separation existed between the areas.

Each system was to have a number of redundant and remote command stations such that if any command location became untenable for any reason the system could be operated from another location. Each system had transponders serving a designated area each transponder communicating with the FCC. In the towers transponders were located every third floor and at each MER. All input and output devices in that area were connected to the transponder. If all communication to the FCC was lost the transponder would operate in degrade mode, i.e., in an alarm condition all strobes would flash and all speakers would sound the evac tone.

Each system also had redundant (style 7) riser cables such that if one was damaged or severed, the system could still communicate via the other risers. In each tower the main riser was in the fire alarm closet, which was created out of the janitor's closet. Two other risers ran the length of the building, one in "A" stairway and one in the "C" stairway. One of these stairway risers ran from the top transponder to the FCC. The other stairway riser ran from the top transponder to the bottom transponder but at each transponder floor the riser ran to the transponder and back to the stairway.

The system transponders were supplied from a fuse cutout off a feeder ahead the main bus of a nearby substation. There were multiple backup sources. Each substation switchboard in the towers was backed up by another substation on the MER floor. The emergency systems were backed up by a tertiary power source from New Jersey. All were backed up by emergency generator power and finally by battery backup power.

Other features of the system included:

* Voice communications to all areas
* Strobes for the hearing impaired in all areas

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* Pull stations at each exit (some additional in the Mall areas) with direct connection to NYFD
* Warden Telephones located in egress path (one on each tower floor, Three on each Plaza Building floor) with direct connection to FCC
* Smoke detectors in each elevator lobby and each EMR for elevator recall
* Smoke detector in each electric and telephone closet
* Smoke detectors at each return air grill or duct on each building floor for fan shutdown
* Smoke detectors in each supply and exhaust duct of each MER AC or return air unit for fan shutdown
* All tenant fire alarm panels monitored for trouble and alarm
* Each FCC had voice communication buttons by zone plus a number of multi-zone as well as an all-call button
* Each transponder was pre-wired to a number of terminal strip cabinets (TSC's) for future modifications or additions of fire alarm devices